

Odd smells snatch my attention unexpectedly. When I mark papers, I can always sense those of the smokers and the fragrance users. Other smells that elicit an immediate response are fresh bread, crushed marigold, pine bark, asphalt in the spring after a rain and putrefaction.

Smell is money, a lot of money, for seven, large, albeit, nearly invisible corporations. The seven Big Boys of Scent, generate twenty billion dollars US annually in gross sales. They manufacture the molecules that scent detergents, bleaches, soaps, and they create the ultra-expensive fragrances sold under Calvin Klein, Chanel, L'Oreal, Miyake and Armani labels.

If you've ever given or received perfume, consider "The Emperor of Scent" by Chandler Burr. It's a story of scientific discovery by Luca Turin, a Frenchman. Turin is a physicist. His contemporaries credit him with applying quantum mechanics to the study of biology. They say he may earn a Nobel prize.

Until Turin, we didn't know how our nose is able so accurately and so quickly to detect and differentiate nearly limitless smells. Molecules inhaled into our nose come in contact with receptor cells. Scientists believed the receptors recognized each type of molecule by its shape. For instantaneous response, there had to be one receptor for each molecule. Once a receptor intercepted its compatible molecule, a circuit was completed signalling the brain that a certain smell had been detected.

This hypothesis is flawed. Since there is a nearly limitless number of smells, there needs to be an equal number of receptor cells. In fact, there are but a few. Second, receptors must have coevolved with certain odours. We should have scent receptors that differentiate what is safe to eat or breathe from what is noxious. But nature has not perfumed the world for us. Cyanide smells like bitter almond and Stilton cheese smells poisonous.

What undermines the coevolution hypothesis is synthetic molecules with unique smells. These compounds didn't exist even one hundred years ago so how could we have evolved scent receptors for them? And yet we can smell them and they smell unique.

Turin hypothesized that molecular vibration, not shape, is responsible for the signal that scent receptors send to the brain. He suggested that a scent receptor is able to hold different molecules, one-at-a-time, and to measure their vibration. Each molecule, as a result of its composition, vibrates uniquely. This is where he introduced quantum mechanics into biology. Simple molecules emit a single note. Larger molecules, composed of many atoms, resonate symphonically.

Hypotheses are creative syntheses which attempt to explain observations. They need proof. Turin created and performed elegant experiments. He demonstrated that molecules of the same shape smell differently. He also demonstrated that molecules of different shape, but with the same vibrations, smell the same.

Don't turn up your nose at reading science, enjoy its insights and intrigues. For example, Turin explains that all the great French perfumes contain some repulsive ingredient like civet, beaver pelt oil, or ambergris. Turin is not just a physicist, his interest in scent originated from a hobby of collecting antique perfumes, in France, a country of smells.

"In France" explains Turin, "there's something called pourriture noble, Noble rot. It's a fungus. It grows on grapes, draws the water out, concentrates the juice wonderfully, adds its own fungal flavour, and then you make wines like the sweet Sauternes."

Turin wrote the Guide to Perfumes. He says nothing kind of Dior, but writes "thanks to Rive Gauche, mortals can at last know the scent of the goddess Diana's bath soap." I'd be surprised if it smells anything like Stilton.